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THE SIGNIFICANCE OF A DECREASING BIRTH-RATE.

The discussion of the relation of population to the means of subsistence, which first took a scientific form in the famous "Essay on Population," published in 1798 by the Rev. Thomas Robert Malthus, was provoked by the theories of equality and human perfectibility set forth in Godwin's "Political Justice." It was also, undoubtedly, a protest against the prevalent feeling in England in favor of a further extension of the poor laws.

Most of those who concern themselves with economic and social questions think that they have a knowledge of Malthusianism sufficient "for practical purposes," as John Stuart Mill said that they have of wealth. Mr. Mill, as we now know, was strangely mistaken about wealth, and it is an error to suppose that many, either students or general readers, have taken the trouble to know the work of Malthus at first hand. It will not be a waste of space, therefore, to recall briefly his exact teaching.

The Malthusian theory of population affirms that population has the "constant tendency to increase beyond the means of subsistence,"* that "population, when unchecked, goes on doubling itself every twenty-five years, or increases in a geometrical ratio,"† and that, "considering the present state of the earth, the means of subsistence, under circumstances the most favorable to human industry, could not possibly be made to increase faster than in an arithmetical ratio;" therefore "the increase of the human species can only be kept down to the level of the means of subsistence by the constant operation of the strong law of necessity, acting as a check upon the greater power,"‡ that is, the power

* Malthus, "Essay on Population," eighth edition, p. 2.

† *Ibid.*, p. 4.

‡ *Ibid.*, p. 6.

of population. The possible checks upon this rapid increase of population are the preventive check, peculiar to man because of his superior reasoning powers and his will, and the positive check to which plants and animals are also subject. The preventive check most strongly approved by Malthus is moral restraint, which he defines as "a restraint from marriage from prudential motives, with a conduct strictly moral during the period of this restraint,"* or as "the restraint from marriage which is not followed by irregular gratifications."† He considers it "the least evil that can arise from the principle of population."‡ All other preventive checks clearly come under the head of vice.

The positive checks he divides into two classes: Misery, which includes "those which appear to arise unavoidably from the laws of nature,"§ and vice, which includes "those which we obviously bring upon ourselves, such as wars, excesses, and many others which it would be in our power to avoid." "They are brought upon us by vice and their consequences are misery."|| The three propositions that Malthus attempts to prove are:

"1. Population is necessarily limited by the means of subsistence.

"2. Population invariably increases where the means of subsistence increase, unless prevented by some very powerful and obvious checks.

"3. These checks, and the checks which repress the superior power of population, and keep its effects on a level with the means of subsistence, are all resolvable into moral restraint, vice and misery."¶

This essay of Malthus called forth many immediate criticisms. Godwin, Coleridge, Hazlitt, Graham, Weyland,

* *Ibid.*, p. 8 (note).

† *Ibid.*, p. 8.

‡ *Ibid.*, p. 7.

§ *Ibid.*, pp. 8-9.

|| *Ibid.*, p. 9.

¶ *Ibid.*, p. 12.

Owen, and others wrote against his "pernicious" and "false" doctrine. Godwin's "Enquiry concerning Population" was by far the most ambitious and the strongest attack upon Malthus, and yet it made comparatively little lasting impression. Godwin himself admitted that even at that time the doctrine of Malthus had gained a firm foothold in the thought of the day. In the fourth chapter of his "Enquiry" he said, "Notwithstanding this glaring rottenness and fallacy in the first concoction of his work, the author has carried the whole world before him; no other system of thinking is admitted into the company of the great; hundreds of men who were heretofore earnest champions of the happiness of mankind have become his converts."* The scientific merit of Godwin's criticism may be judged by the fact that his objections to the Malthusian doctrine have no weight in the modern discussion of the subject, whereas the classical doctrine of Malthus is still worthy of respectful consideration.

These discussions had in a measure passed out of the public mind, when the question assumed a new form in the writings of Mr. Herbert Spencer. In an essay on the "Theory of Population Deduced from the General Law of Animal Fertility," published in the *Westminster Review* in 1852, he first stated his ideas on population, which were afterward more fully developed in his "Principles of Biology." Mr. Spencer treats the Malthusian theory from a strictly biological and evolutionary point of view. He agrees with Malthus that population constantly tends to increase beyond the means of subsistence, but adds that this very fact is the cause of the progress of the human race. It stimulates man to greater effort, "causes a never-ceasing requirement for skill, intelligence and self-control; involves, therefore, a constant exercise of these and gradual growth of them."† "Excess of fertility, through the changes it is ever working

* Godwin, "Enquiry concerning Population," 1820. B. I. ch. IV., p. 27.

† Spencer, "Principles of Biology," II. Part VI. p. 499.

in man's environment, is itself the cause of man's further evolution; and the obvious corollary here to be drawn, is, that man's further evolution so brought about, itself necessitates a decline in his fertility."* The latter clause is Mr. Spencer's peculiar contribution to the subject. He holds that throughout the vegetable and the animal world, and in the human race itself, "Individuation and Genesis are necessarily antagonistic,"† by Individuation meaning "all processes by which individual life is completed and maintained," and by Genesis "all processes aiding the formation and perfecting of new individuals." He therefore concludes that "the further progress of civilization which the never-ceasing pressure of population must produce, will be accompanied by an enhanced cost of Individuation,"‡ and consequently by a diminishing birth-rate. This statement is not a refutation of the Malthusian doctrine, as some would maintain, first, because Mr. Spencer is "simply pointing out how the preventive check applies itself,"§ and, second, because as Mr. Spencer himself states in regard to the lower animal and the vegetable world, the higher type is better adapted to its conditions, has a chance of longer survival, and therefore a greater chance of leaving offspring. "Though the more evolved organism is the less fertile absolutely, it is the more fertile relatively."|| In his speculative thought upon the future of the human race, Mr. Spencer sees that the highest product of evolution will be "a form in which the amount of life shall be the greatest possible, and the births and deaths the fewest possible,"¶ in other words, that as the birth-rate diminishes, the death-rate also will diminish, until the excess of fertility disappears. Man is continually progressing toward a state of perfect equilibrium with his

* *Ibid.*, p. 501.

† *Ibid.*, p. 409.

‡ *Ibid.*, p. 501.

§ President E. B. Andrews, "Are There Too Many of Us?"—*North American Review*, November, 1892, p. 597.

|| Spencer, "Principles of Biology," II, Part VI, p. 478.

¶ *Ibid.*, p. 506.

environment, and in such a state there will also be an equilibrium of births and deaths. Such will be the final "state of harmony in which each of the factors is just equal to its work,"* and evolution shall have ceased. Not until this ultimate point is reached will the doctrine of Malthus cease in general to be true.

Mr. Spencer's contribution closes one era in the development of the theory of population. Up to this point the discussion was entirely theoretical, or was based upon general observation rather than upon definite statistical data.

The second, or present, era in the development of the theory owes its marked difference in character to the economic and industrial changes which have practically greatly modified the relations between subsistence and the birth-rate. It is the period following a remarkable development of the factory system and the adoption of free trade by England. The many inventions, the applications of steam and electricity, the increased facilities for transportation both by railway and by steamship, have entirely changed the character of the economic and industrial life. Wealth has increased much faster than population, both in Europe and in America. This fact has been determined not by general observation, but by exact, or relatively exact, statistical investigation. The investigations of M. Levasseur show that there has not been even a "tendency" of population to overtake the means of subsistence. "By a natural tendency, without any violent repression from exterior forces or any painful restraint upon desires, population has grown less rapidly than wealth, and has thus increased its well-being. The principal cause of this phenomenon, which in his day Malthus could scarcely have suspected, is the enormous productive power that has been given to industry by the discoveries of science." †

* *Ibid.*, p. 508.

† E. Levasseur, "*La Population française*," III, p. 109.

Statistics show also great variations in the rates of increase of population when comparisons have been made by countries, by nationalities, or by city and rural districts. More specifically, attention has been called to the fact of an actually declining birth-rate in many countries of high civilization,* especially in France, New England, and, during the last ten years, in the United States as a whole.† This does not necessarily indicate a natural decrease in population, since the death-rate may be correspondingly low in these regions. Dr. Longstaff, however, thinks that "under the conditions of modern life, with a high birth-rate there will be associated a rapidly increasing population,"‡ and undoubtedly the converse would hold true. In France the statistics for the last few years show that the population has absolutely decreased.

These facts make it evident that the question of population in its relation to economic development must undergo a thorough reconsideration. Already several important and many minor studies have been made in this direction by Dr. George Hansen in Germany; M. Levasseur, M. Leroy-Beaulieu and M. Dumont in France; Dr. George Blundell Longstaff and Dr. J. Milner Fothergill in England; and Dr. John S. Billings, Dr. Cyrus M. Edson, and President E. B. Andrews in the United States.

M. Levasseur maintains that inequalities of production and consumption are primarily the causes of changes in the rate of the increase of population.

"The increase of a population is dependent upon the sum of its means of subsistence and the sum of its wants, and hence between the terms population, production and consumption there exists an intimate relation. But it is not unchangeable. This is one reason why in every population there

* P. Leroy-Beaulieu, "The Influence of Civilization upon the Movement of Population," *Economiste Français*, September 20 and 27, 1890, and *Journal of the Royal Statistical Society of London*, June, 1891.

† Dr. J. S. Billings, "The Diminishing Birth-rate in the United States."—*The Forum*, June, 1893.

‡ Longstaff, "Studies in Statistics," p. 11.

are both rich and poor, why peoples and individuals may enrich or impoverish themselves, and in consequence why the number of inhabitants of a country may increase rapidly or slowly, remain stationary or diminish." *

M. Levasseur considers the conditions in France most favorable from an economic point of view. In his opinion it is very desirable that each generation should be born into a better condition than that of the preceding generation, and that the standard of life should be raised; this result, he says, will happen, as it has happened in France, where wealth increases faster than population and is widely diffused. †

From a political point of view he considers the question very serious, since the decreasing population of France makes her armies inferior in numbers to those of other nations. ‡ On the whole, however, he approves of the present condition of population in France.

M. Dumont holds that wealth is not the cause of the diminishing birth-rate, but only the condition; that, though on the surface the decrease of population is an economic question, at bottom it is intellectual, political, and æsthetic; that as the desire to rise in the industrial, intellectual, political, or æsthetic world increases, the birth-rate diminishes. §

M. Leroy-Beaulieu shows statistically that "a low birth-rate goes hand in hand with high wages and the spread of education," and that, "it also appears to be particularly associated with democratic aspirations, and still more with a lessening of religious belief on the part of the people, and a modification of the old ideas of resignation and submission to their lot." ||

* Levasseur, "*La Population française*," III, p. 27.

† *Ibid.*, p. 223.

‡ *Ibid.*, p. 224.

§ Dumont, "*Dépopulation et Civilisation*," p. 356.

|| P. Leroy-Beaulieu, "The Influence of Civilization upon the Movement of Population."—*Economiste Français*, Sept. 20 and 27, 1890, and the *Journal of the Royal Statistical Society of London*, June, 1891.

Dr. Hansen,* Dr. Longstaff,† and Dr. Fothergill,‡ show especially the evil influences of city life upon the population, both in weakening the vitality and in diminishing the birth-rate. Dr. John S. Billings,§ Dr. Cyrus M. Edson,|| and President E. B. Andrews,¶ have studied the question as it is presented in the United States. President Andrews, though he refuses to adhere strictly to the classical Malthusian doctrine, accepts the main principle that subsistence is limited, and that therefore some checks are necessary to keep the population within the limits of subsistence. Dr. Billings and Dr. Edson discuss the diminishing birth-rate in the United States and its probable causes.

The generalizations tentatively reached by all these inquirers are that civilization in general checks the rate of increase of population in spite of a diminishing death-rate; that city life is on the whole unfavorable to the natural increase of population, and that what the economists call the "raising of the standard of life" operates in the same way.

It has been assumed that the changes in the marriage-rate and the marriage age will account in a great measure for the decreasing birth-rate, but another explanation is more than hinted at in the following quotation from Dr. John S. Billings:

"It is probable that the most important factor in the change is the deliberate and voluntary avoidance or prevention of child-bearing on the part of a steadily increasing number of married people, who not only prefer to have but few children, but who know how to obtain their wish." **

* Hansen, "*Die drei Bevölkerungstufen.*"

† Longstaff, "Studies in Statistics."

‡ Fothergill, "The Town Dweller."

§ Billings, "The Diminishing Birth-rate in the United States."—*The Forum*, June, 1893.

|| Edson, "American Life and Physical Deterioration,"—*North American Review*, October, 1893.

¶ Andrews, "Are There Too Many of Us?"—*North American Review*, November, 1892.

** Billings, "The Diminishing Birth-rate in the United States."—*The Forum* June, 1893.

M. Levasseur and M. Dumont evidently hold the same opinion :

“By prevision we understand the human will, restraining or directing the reproductive instinct, with a view to bringing children into the world only at such times and in such numbers that the father can hope to support them and to educate them for a position equal to his own. Prevision is the characteristic of the man who reflects, and who, conscious of his responsibilities, does not leave his destiny to chance. This virtue is the palladium of human liberty. The philosopher and the economist who believe in that liberty ought, if they are logical, to recommend such prevision, recognizing that if it is useful in the great mass of actions, it is nowhere more opportune than in the grave question of the growth of the family and the education of the child. . . . It is enough to lay down as a general rule that reason should control instinct.” * M. Dumont says, “The real cause of the decrease of our birth-rate is the wish to have few or no children, and that wish is determined by a combination of intellectual, moral, and æsthetic tendencies peculiar to our people.” †

Dr. Cyrus M. Edson agrees with Dr. Billings that “the voluntary avoidance and prevention of child-bearing is steadily increasing,” but thinks that the principal cause is the physical and nervous deterioration of the women of the United States, and this, he asserts, is largely due to the severe strain of modern life and education. ‡ In fact, anyone who is at all familiar with the statistical and medical literature of the subject is aware that the voluntary prevention of conception is the explanation of the diminishing birth-rate that is generally accepted by physicians and statisticians.

* Levasseur, “*La Population Française*.” III, pp. 218-220.

† Dumont, “*Dépopulation et Civilisation*,” p. 97.

‡ Cyrus M. Edson, “American Life and Physical Deterioration.”—*North American Review*, October, 1893.

It is clear from the foregoing review that any further contributions to the theory of population must come from the side of statistics; that only by careful statistical investigation can the laws which govern the increase or the decrease of population be determined. The true method has evidently been applied in the exhaustive studies of M. Levasseur in France. It should also be applied to the statistical data furnished by other countries, but especially should these investigations be made in the United States. There are presented here contrasts of geography, race, nationality, of industrial and social conditions not to be found in any other part of the world, and they are on such a scale of magnitude as to render them peculiarly well adapted to statistical research. Few people realize the wealth of material contained in our census and other statistical reports. It has frequently been used to show detached facts or to illustrate special topics, but not often to throw fresh light upon economic or sociological theory.

For a complete study of the birth-rate it is obviously necessary that there should be many more comparisons of one group of statistical facts with another than those which have already been made by Dr. Billings and Dr. Edson. Many other conditions indicative of the general advance of civilization and of individual evolution should be compared with the birth-rate. Further statistical research may prove that their theory of the cause of the diminishing birth-rate is insufficient.

The present investigation is a preliminary study of a few of the many facts found in the United States census reports. Its object is to show the relation of the birth-rate in different parts of the United States to certain phenomena which, it is thought, may have some influence upon the number of births. The statistics used are taken from the tenth census reports. The age of these figures is no bar to their use in such an investigation. The relation of connected phenomena to one another will appear in them as clearly as in figures of more

recent origin. The complete vital statistics of the eleventh census are not yet available.

The birth-rates of the white and the colored population are compared, the relation between the birth-rate and the death-rate from nervous diseases is shown for both sexes, and also the relation between the birth-rate and the density of population, the agricultural wealth, the manufactured wealth, and the mortgage indebtedness.

The vital statistics of the tenth census were tabulated according to a different plan from that of all the other statistics of that census. The unit of locality used was not the State or Territory, but the county. As it was, however, a work of too great magnitude to show the relations of each cause of death to the sex, age, etc., in each of the 2605 counties of the United States, and as the numbers for many of the counties would have been too small to permit of any useful deductions, Dr. Billings decided to make the more elaborate compilations for groups of counties within the limits of each State. The selection of the counties that formed these "State groups" was made by Mr. Henry Gannett, the geographer of the census. The groups were selected in most cases according to the topographical features of the State, and evidently could be consolidated by States for comparison with the tables of past or future censuses, with those of the State censuses, or with the other statistics of the same census. They were also consolidated into larger "grand groups," whose boundaries were determined by topographical peculiarities and not by State lines.* There are in the United States twenty-one of these "grand groups," made up from 111 "State groups."†

* Tenth Census. Vital Statistics I, p. xiv.

† Grand Group I, the North Atlantic Coast region, includes the following State groups; Maine 1, New Hampshire 1, Massachusetts 1, Rhode Island, Connecticut 1.

Grand Group II, the Middle Atlantic Coast region, includes New York 1, New Jersey 1, Maryland 1, Delaware, District of Columbia, Virginia 1.

Grand Group III, the South Atlantic Coast region, includes North Carolina 1, South Carolina 1, Georgia 1.

Grand Group IV, the Gulf Coast region, includes Florida, Alabama 1, Louisiana 1, Mississippi 1, Texas 1.

In the diagrams or charts graphically illustrating the results obtained in the tables, such curves as have heretofore been used to represent sequent phenomena in the same group, and to compare different sets of sequent phenomena, are employed (1) to compare *co-existent* phenomena in the same group, (2) to compare the same phenomena in different groups, and (3) to compare the relations between the different co-existent phenomena in one group with the relations of those in other groups.*

Grand Group V, the northeastern hills and plateaus, includes Maine 2, New Hampshire 2, Vermont, Massachusetts 2, Connecticut 2, New York 2.

Grand Group VI, the Central Appalachian region, includes New York 3, New Jersey 2, Pennsylvania 1, Maryland 2.

Grand Group VII, the region of the Great Northern Lakes, includes New York 4, Ohio 1, Michigan 1, Indiana 1, Illinois 1, Wisconsin 1.

Grand Group VIII, the Interior Plateau, includes New York 5, Pennsylvania 2, Virginia 2, North Carolina 2.

Grand Group IX, the Southern Central Appalachian region, includes Virginia 3, West Virginia 1, North Carolina 3, South Carolina 2, Kentucky 1, Tennessee 1, Georgia 2, Alabama 2.

Grand Group X, the Ohio River belt, includes Ohio 2, Indiana 2, West Virginia 2, Kentucky 2.

Grand Group XI, the Southern Interior Plateau, includes South Carolina 3, Georgia 3, Alabama 3, Mississippi 2, Tennessee 2.

Grand Group XII, the South Mississippi River belt, includes Kentucky 3, Tennessee 2, Mississippi 3, Louisiana 2, Arkansas 1.

Grand Group XIII, the North Mississippi River belt, includes Missouri 1, Iowa 1, Illinois 2, Wisconsin 2, Minnesota 1.

Grand Group XIV, the Southwest Central region, includes Missouri 2, Arkansas 2, Louisiana 3, Texas 2.

Grand Group XV, the Central region, plains and prairies, includes Ohio 3, Kentucky 4, Tennessee 4, Indiana 3.

Grand Group XVI, the Prairie region, includes Missouri 3, Iowa 2, Illinois 3, Kansas 1, Nebraska 1, Wisconsin 3, Minnesota 2, Dakota 1.

Grand Group XVII, the Missouri River belt, includes Missouri 4, Iowa 3, Nebraska 2, Dakota 2.

Grand Group XVIII, the region of the Western Plains, includes Dakota 3, Montana 1, Wyoming 1, Nebraska 3, Kansas 2, Colorado 1, New Mexico 1, Texas 3.

Grand Group XIX, the heavily timbered region of the Northwest, includes Michigan 2, Wisconsin 4, Minnesota 3.

Grand Group XX, the Cordilleran region, includes Montana 2, Washington 1, Wyoming 2, Idaho, Oregon 1, Colorado 2, Utah, Nevada, California 1, Arizona, New Mexico 2.

Grand Group XXI, the Pacific Coast region, includes California 2, Oregon 2, Washington 2.

* After this part of the present investigation had been completed, a similar comparison appeared in an article on "The Life and Labour of the People of London," by Charles Booth, Esq., President of the Royal Statistical Society of London. It was delivered November 21, 1893, and was published in the *Journal of the Royal*

The interconnection of the conditions compared in the present investigation is shown by noting the conditions that cohere and the conditions that are opposed in the same group and in the different groups; that is, by noting in how many groups two given conditions are both above or both below the averages of the same conditions for the United States, and in how many groups these conditions oppose each other, one being above the average for the United States and the other below. If such coherence or opposition is found in a large majority of the groups, some causal relation may evidently be inferred. The curves, of course, in themselves mean nothing; they are simply a means of directing the eye to certain points.

The number of deaths from nervous diseases has been chosen for comparison with the birth-rate, because it is in general a measure of the degree of civilization. Dr. Edson has clearly shown that the higher the civilization, the greater is the intensity of life, and the heavier is the strain upon the nervous system; consequently, the number of deaths from nervous diseases will be proportionally greater in the more highly civilized countries. Therefore, if civilization checks the birth-rate, as is affirmed by Mr. Spencer and others, we should expect the death-rate from nervous diseases to rise as the birth-rate falls, and *vice versa*. These statistics of the tenth census have been compiled on the basis of deaths from known causes, instead of on the usual basis of the living population, and therefore any comparison with similar statistics of other countries is impossible.

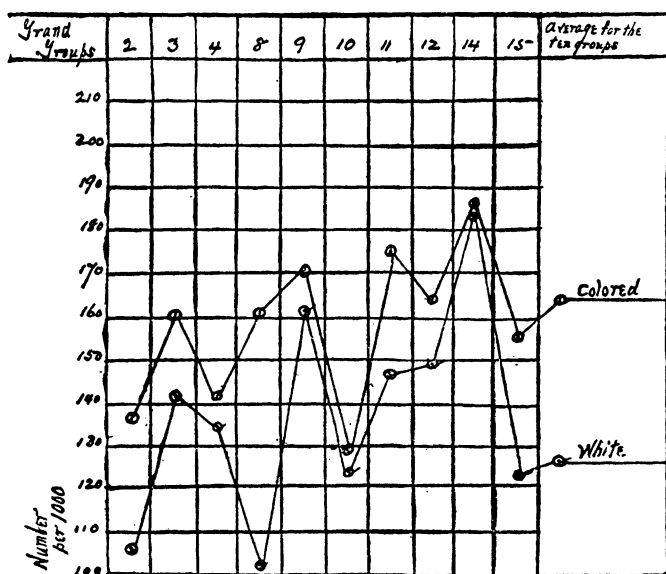
In this investigation the figures for the grand groups, as given in the tabulations of the tenth census, are used without further computation; but, since only the aggregates are

Statistical Society, December, 1893. In the twenty-seven registration districts of London, Mr. Booth makes a suggestive study of certain conditions that may influence the increase or decrease of population: poverty, crowding, early marriages, surplus of unmarried men, high birth-rate, and high death-rate. In his tables he shows the interconnection of these conditions "by arranging the London registration districts in order of each of these conditions in turn, from **maximum** to **minimum**, and by comparing these orders."

given for the State groups, it was necessary to make many new computations. The figures for the States and Territories were obtained by combining those of the State groups.

CHART I.

BIRTH-RATE OF WHITE AND COLORED IN CERTAIN GRAND GROUPS,
1880.



The first study is a comparison of the white and the colored birth-rates in the ten grand groups in which the distinction of color is made; namely, in all grand groups in which the colored population forms twenty per cent or more of the total population. The birth-rates are estimated on the basis of the number of women of child-bearing age, that being, as all statisticians agree, a more scientific birth-rate than one estimated on the basis of the total population.

The average colored birth-rate in 1880 for these ten groups was 163.8 per thousand women between the ages of fifteen and forty-nine (both inclusive), while the white birth-rate was 127.1 per thousand. The variation from the average birth-rate for the ten groups is shown for each group in Table I, and more distinctly in Chart I. It will be observed that in four of the ten groups both the white and the colored birth-rates are above the average, and in four others they are both below the average; in other words, in eight of the ten grand groups the phenomena cohere.

TABLE I.

COMPARISON OF BIRTH-RATES, WHITE AND COLORED, IN CERTAIN GRAND GROUPS, 1880.

NOTE. The asterisk (*) is used throughout this essay to indicate the coherence of the phenomena discussed.

GRAND GROUPS.	Birth-rate per 1000 women between the ages of 15 and 49 (both inclusive).		Variation above or below the average.	
	White.	Colored.	White.	Colored.
Average for the 10 groups.	127.1	163.8
2	106.7	136.8	—20.4†	—27.0*
3	142.1	160.1	+15.0†	—3.7
4	134.5	142.3	+7.4†	—21.5
8	102.3	161.5	—24.8	—2.3*
9	161.5	169.6	+34.4†	+5.8*
10	123.8	129.5	—3.7†	—34.3*
11	147.1	174.8	+19.6†	+11.0*
12	149.6	163.9	+22.5†	+0.1*
14	184.7	187.1	+57.6†	+23.3*
15	123.4	155.9	—3.7†	—7.9*

* Coherences in *eight* groups.

Oppositions in *two* groups.

† White birth-rate higher relatively in *nine* groups.

In Table II the same study is made in the twenty-three State groups in which the distinction of white and colored population is made; that is, in those groups in which the colored population forms fifty per cent or more of the total

population. In fifteen of the twenty-three State groups the white and the colored birth-rates rise and fall together ; in six groups both rise above the average, and in nine both fall below.

TABLE II.

COMPARISON OF BIRTH-RATES, WHITE AND COLORED, IN CERTAIN STATE GROUPS, 1880.

STATE GROUPS.	Birth-rate per 1000 women between ages of 15 and 49.		Variation above or below the average.	
	White.	Colored.	White.	Colored.
Average for 23 State groups .	141.52	166.77
Alabama 1	104.9	107.8	—36.6†	—59.0*
Alabama 2	165.4	176.3	+23.9†	+9.5*
Alabama 3	145.8	164.2	+4.3†	—2.6
Arkansas 1	174.9	176.6	+33.4†	+9.8*
District of Columbia	94.1	118.7	—47.4	—48.1*
Florida	142.6	149.5	+1.1†	—17.3
Georgia 1	156.7	152.3	+15.2†	—14.5
Georgia 3	139.0	169.6	—2.5	—2.8*
Louisiana 1	131.0	140.8	—10.5†	—22.0*
Louisiana 2	145.7	154.2	+4.2†	—12.6
Louisiana 3	172.7	181.3	+31.2†	+14.5*
Mississippi 1	126.3	148.0	—15.2†	—18.8*
Mississippi 2	158.2	178.4	+16.7†	+11.6*
Mississippi 3	144.1	162.1	+2.6†	—4.7
North Carolina 1	140.2	161.9	—1.3†	—4.9*
North Carolina 2	138.3	180.3	—3.2	+13.5
South Carolina 1	135.1	161.4	—6.4	—5.4*
South Carolina 3	141.4	186.9	—0.1	+20.1
Tennessee 2	154.1	192.9	+12.6	+26.1*
Tennessee 3	142.8	167.8	+1.2†	+1.0*
Texas 1	146.2	149.7	+4.7†	—17.1
Virginia 1	129.9	158.8	—11.6	—8.0*
Virginia 2	120.5	164.4	—21.0	—2.8*

Twenty-three State groups.

* Coherences in fifteen groups.

† Oppositions in eight groups.

† White rate relatively higher than colored in fifteen groups.

Such a remarkable number of coherences in both State and grand groups naturally suggests that there must be

some underlying cause that determines the birth-rate of both white and colored population. Table I and Chart I show also that in both the white and the colored birth-rates, there is a decided difference, in the relative variation of each from the average rate; for example, in eight of the ten grand groups the white birth-rate is relatively higher than the colored; that is, it is either relatively higher above the average rate than is the colored birth-rate in the same group above its average, or it is not relatively so far below the average rate as is the colored. The same thing is seen in the State groups (Table II). In fifteen of the twenty-three groups the white birth-rate is relatively higher than the colored.

This fact, added to that of the greater diminution of the colored than of the white birth-rate during the last decade, is admitted by Dr. Billings to be a strong argument against his theory of the causation of the lowered birth-rate for this country.*

He, however, tries to explain away the difficulty by attributing the greater decrease in the colored birth-rate partly to the larger number of errors in the data from which the rates are calculated, and partly to the greater relative effect of the voluntary prevention of conception in the South where the practice is comparatively new. Neither of these suggestions seems sufficient to account for the greater diminution of the birth-rate in the South. There is possibly a larger proportion of error in the data collected from the colored people than in that obtained from the Southern white population as a whole, though the information gained from the "poor whites" is probably fully as unreliable as that obtained from the colored people. The statistics in both cases were gathered by the same census enumerators and according to the same method, and therefore the allowance for greater error in the statistics of the colored population

* Billings, "The Diminishing Birth-rate in the United States."—*The Forum*, June, 1893.

must necessarily be small. The second explanation seems wholly inadequate. No one would claim that the practice of the voluntary prevention of conception is common among the colored people; it is even improbable that it is often found among those of this race who live in cities, and certainly not among the rural population. It cannot be an important factor in the diminishing birth-rate of the colored population.

All will grant that this practice is a product of civilization, and is confined almost entirely to the white population of the United States, and probably to a comparatively small part of that population. If this be so, it can scarcely be accounted the "most important factor" of the diminishing birth-rate of the United States, although it may be an important factor in certain parts of the country and undoubtedly is "steadily increasing." The fact that the lines of the white and the colored birth-rates so closely follow each other (Tables I, II and Chart I) makes it clear that there is some underlying principle of population that determines them both. The explanation advanced by Dr. Billings can hold true of certain localities only at present. It cannot, therefore, be the fundamental cause of the diminishing birth-rate. What that cause is must be left for future investigators to discover.

The comparison of the birth-rates with the death-rates from nervous diseases is significant (Table III and Chart II). The average number of deaths from nervous diseases per thousand deaths from known causes in the United States for 1880, is 113.8: 118.6 for males, 108.6 for females. In only two of the twenty-one grand groups do the birth-rates and the deaths from nervous diseases rise or fall together; in nineteen they oppose each other. In ten of the nineteen groups the birth-rate falls below and the death-rate from nervous diseases rises above the average; in nine the birth-rate rises above the average and the death-rate from nervous diseases falls below. This is true for both sexes, and it happens that for both sexes the phenomena vary

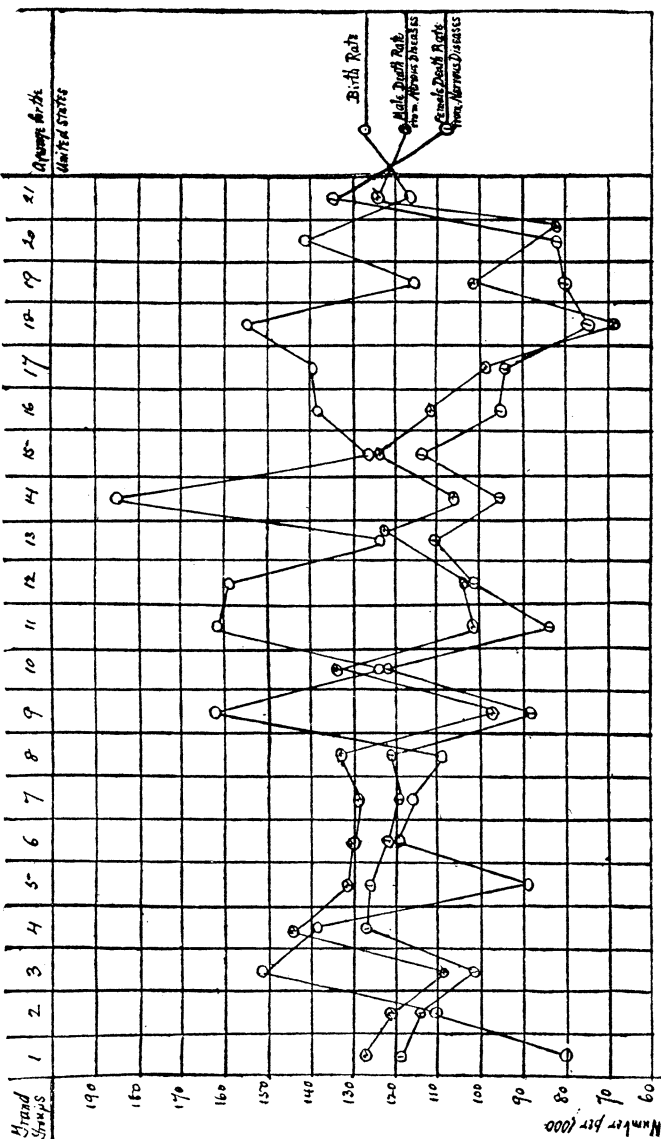
together in the same groups,—grand groups four and nineteen. It may be observed also that in nineteen of the twenty-one groups the death-rate from nervous diseases is higher among males than among females.

TABLE III.

COMPARISON OF BIRTH-RATES AND DEATHS FROM NERVOUS DISEASES
BY GRAND GROUPS, 1880.

GRAND GROUPS.	Birth-rate per 1000 women between ages of 15 and 49.	Male deaths from nervous diseases per 1000 deaths from known causes.	Female deaths from ner- vous diseases per 1000 deaths from known causes.	VARIATION ABOVE OR BELOW THE AVERAGE.		
				Birth-rate.	Male deaths from nervous dis- eases.	Female deaths from nervous diseases.
United States	127.5	118.6	108.6	—	—	—
1	80.0	127.2	119.1	—47.5	+ 8.6	+ 10.5
2	110.1	121.0	114.3	—17.4	+ 2.4	+ 5.7
3	151.9	108.0	101.3	+ 24.4	—10.6	— 7.3
4	137.7	144.4	127.4	+ 10.2	+ 25.8*	+ 18.8*
5	89.3	131.7	126.4	—38.2	+ 13.1	+ 17.8
6	119.2	130.2	120.3	— 8.3	+ 11.6	+ 11.7
7	115.8	129.2	119.5	—11.7	+ 10.6	+ 10.9
8	109.2	133.2	120.0	—18.3	+ 14.6	+ 11.4
9	162.9	96.9	88.1	+ 35.4	—21.7	—21.5
10	124.2	133.9	122.9	— 3.3	+ 15.3	+ 14.3
11	161.6	100.8	84.2	+ 34.1	—17.8	—24.4
12	158.7	103.3	100.8	+ 31.2	—15.3	— 7.8
13	124.1	123.3	109.8	— 3.4	+ 4.7	+ 1.2
14	185.2	106.5	95.7	+ 57.7	—12.1	—12.9
15	126.4	124.4	113.4	— 1.1	+ 5.8	+ 4.8
16	138.4	110.8	94.8	+ 10.9	— 7.8	—13.8
17	139.2	99.2	93.3	+ 11.7	—19.4	—15.3
18	154.5	69.0	75.4	+ 27.0	—49.6	—33.2
19	115.4	102.2	80.3	—12.1	—16.4*	—28.3*
20	141.4	82.6	82.2	+ 13.9	—36.0	—26.4
21	115.6	124.0	135.5	—11.9	+ 5.8	+ 26.9
Coherences with birth-rate					2	2
Oppositions to birth-rate					19	19
Total groups					21	21

CHART II.
COMPARISON OF BIRTH-RATES AND DEATHS FROM NERVOUS DISEASES BY GRAND GROUPS, 1880.



A study of the State groups (Table IV) shows that in fifty-six groups the birth-rate is above the average for the United States and the death-rate from nervous diseases is below the average, and in thirty groups the birth-rate falls below the average and the death-rate from nervous diseases rises above that is, in eighty-six of the one hundred eight groups the phenomena oppose each other.

The same study by States and Territories (Tables V and VI) shows that in thirty-nine of the forty-seven States and Territories the birth-rate and the deaths from nervous diseases are opposed; in twenty-six States and Territories the birth-rate is above the average for the United States and the death-rate from nervous diseases is below, while in thirteen States and Territories the birth-rate is below the average and the death-rate from nervous diseases is above.

The obvious deductions from such facts are (1) that the conditions that cause a high death-rate from nervous diseases lower the birth-rate and *vice versa*, and (2) that since, in two-thirds of the thirty-nine States and Territories in which the phenomena oppose each other, the birth-rate is above the average and the death-rate from nervous diseases below the average, the variations above and below the average in the remaining one-third must be proportionally greater; in other words, the conditions of life which cause such variations must be more intense. If civilization, as Mr. Spencer believes, be the cause of the lower birth-rate, we should expect a high civilization where the birth-rate is low. These conclusions are confirmed by the statistics. The thirteen States in which the birth-rate is low and the death-rate from nervous diseases is high, are Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Delaware, Maryland, the District of Columbia, and Ohio. These States are acknowledged to have reached a higher state of civilization than most of those in the other group. They are more thickly settled, have a greater degree of wealth per capita, and possess more of the marks of an advanced civilization.

TABLE IV.

COMPARISON OF BIRTH-RATE AND DEATHS FROM NERVOUS DISEASES
BY STATE GROUPS, 1880.

STATE GROUPS.	Birth-rate per 1000 women between the ages of 15 and 49.	Deaths from nervous diseases per 1000 deaths from known causes.	VARIATION ABOVE OR BELOW THE AVERAGE.	
			Birth-rate.	Deaths from nervous diseases.
United States	127.5	113.8
Alabama 1	106.3	179.4	-21.2	+65.6
Alabama 2	168.1	89.6	+40.6	-24.2
Alabama 3	156.0	92.8	+28.5	-21.0
Arizona	114.4	70.1	-13.1	-43.7*
Arkansas 1	176.0	102.6	+48.5	-11.2
Arkansas 2	192.6	105.4	+65.1	-8.4
California 1	115.7	110.2	-11.8	-3.6*
California 2	108.2	121.7	-19.3	+7.9
Colorado 1	104.6	79.7	-22.9	-34.1*
Colorado 2	121.9	70.7	-5.6	-43.1*
Connecticut 1	82.5	152.2	-45.0	+38.4
Connecticut 2	84.3	154.6	-43.2	+40.8
Dakota 1	176.7	74.5	+49.2	-39.3
Dakota 2	173.3	75.1	+45.8	-38.7
Dakota 3	124.9	105.8	-2.6	-8.0*
Delaware	113.2	135.3	-14.3	+21.5
District of Columbia	103.1	122.8	-24.4	+9.0
Florida	145.9	121.0	+18.4	+7.2*
Georgia 1	154.4	110.2	+26.9	-3.6
Georgia 2	157.8	95.3	+30.3	-18.5
Georgia 3	155.5	86.8	+28.0	-27.0
Idaho	183.3	86.0	+55.8	-27.8
Illinois 1	123.7	137.0	-3.8	+23.2
Illinois 2	131.9	104.1	+4.4	-9.7
Illinois 3	126.4	110.5	-1.1	-3.3*
Indiana 1	117.8	115.2	-9.7	+1.4
Indiana 2	127.7	112.5	+0.2	-1.3
Indiana 3	121.2	113.9	-6.3	+0.1
Iowa 1	116.3	116.0	-11.2	+2.2
Iowa 2	136.3	100.7	+8.8	-13.1
Iowa 3	143.0	93.8	+15.5	-20.0
Kansas 1	153.2	88.5	+25.7	-25.3
Kansas 2	178.6	83.6	+51.1	-30.2
Kentucky 1	193.7	77.3	+66.2	-36.5
Kentucky 2	124.1	120.3	-3.4	+6.5

TABLE IV.—Continued.

STATE GROUPS.	Birth-rate per 1000 women between the ages of 15 and 49.	Deaths from nervous diseases per 1000 deaths from known causes.	VARIATION ABOVE OR BELOW THE AVERAGE.	
			Birth-rate.	Deaths from nervous diseases.
Kentucky 3	150.6	82.9	+23.1	-30.9
Kentucky 4	144.1	117.4	+16.6	+3.6*
Louisiana 1	135.1	132.8	+7.6	+19.0*
Louisiana 2	152.3	116.4	+24.8	+2.6*
Louisiana 3	177.5	108.4	+50.0	-5.4
Maine 1	75.7	129.6	-51.8	+15.8
Maine 2	93.2	104.6	-34.3	-9.2*
Maryland 1	121.2	122.7	-6.3	+8.9
Maryland 2	132.8	149.3	+5.3	+33.5*
Massachusetts 1	81.5	112.0	-46.0	-1.8*
Massachusetts 2	87.2	132.4	-40.3	+18.6
Michigan 1	129.6	94.3	+2.1	-19.5
Michigan 2	101.2	103.7	-25.4	-10.1*
Minnesota 1	132.7	105.0	+5.2	-8.8
Minnesota 2	162.3	77.5	+34.8	-36.3
Minnesota 3	185.4	69.3	+57.9	-44.5
Mississippi 1	132.5	115.9	+5.0	+2.1*
Mississippi 2	168.4	100.8	+40.9	-13.0
Mississippi 3	157.8	109.5	+30.3	-4.3
Missouri 1	113.7	134.7	-13.8	+20.9
Missouri 2	165.0	102.2	+37.5	-11.6
Missouri 3	149.6	114.7	+22.1	+0.9*
Missouri 4	135.4	96.5	+7.9	-17.3
Montana	153.4	91.2	+25.9	-22.6
Nebraska 1	180.3	65.7	+52.8	-48.1
Nebraska 2	144.4	104.4	+16.9	-9.4
Nebraska 3	165.3	73.9	+37.8	-39.9
Nevada	122.2	81.2	-5.3	-32.6*
New Hampshire 1	68.0	140.5	-59.5	+26.7
New Hampshire 2	79.2	131.3	-48.3	+17.5
New Jersey 1	104.3	161.2	-23.2	+47.4
New Jersey 2	100.5	158.1	-27.0	+44.3
New Mexico 1	156.8	23.2	+29.3	-90.6
New Mexico 2	134.9	33.0	+7.4	-80.8
New York 1	104.6	102.5	-22.9	-11.3*
New York 2	100.0	123.5	-27.5	+9.7
New York 3	89.4	122.9	-38.1	+9.1
New York 4	90.4	133.3	-37.1	+19.5
New York 5	80.3	132.3	-47.2	+18.5

TABLE IV.—*Concluded.*

STATE GROUPS.	Birth-rate per 1000 women between the ages of 15 and 49.	Deaths from nervous diseases per 1000 deaths from known causes.	VARIATION ABOVE OR BELOW THE AVERAGE.	
			Birth-rate.	Deaths from nervous diseases.
North Carolina 1	150.4	99.1	+22.9	-14.7
North Carolina 2	154.2	82.1	+26.7	-31.7
North Carolina 3	163.9	69.2	+36.4	-44.6
Ohio 1	108.1	128.3	-19.4	+14.5
Ohio 2	115.6	141.3	-11.9	+27.5
Ohio 3	111.5	136.0	-16.0	+22.2
Oregon 1	170.2	77.7	+42.7	-36.1
Oregon 2	138.8	107.5	+11.3	- 6.3
Pennsylvania 1	127.2	117.1	- 0.3	+ 3.3
Pennsylvania 2	108.4	137.4	-19.1	+23.6
Rhode Island	86.0	124.0	-41.5	+10.2
South Carolina 1	152.7	108.9	+25.2	- 4.9
South Carolina 2	165.5	72.9	+38.0	-40.9
South Carolina 3	167.1	88.2	+39.6	-25.6
Tennessee 1	160.7	89.9	+33.2	-23.9
Tennessee 2	167.6	97.8	+40.1	-16.0
Tennessee 3	153.8	91.6	+26.3	-22.2
Tennessee 4	153.7	102.5	+26.2	-11.3
Texas 1	147.4	157.1	+19.9	+43.3*
Texas 2	192.1	97.7	+64.6	-16.1
Texas 3	190.2	64.7	+62.7	-49.1
Utah	198.9	80.8	+71.4	-33.0
Vermont	88.7	122.8	-38.8	+ 9.0
Virginia 1	144.9	113.6	+17.4	- 0.2
Virginia 2	142.8	116.4	+15.3	+ 2.6*
Virginia 3	154.1	103.5	+26.6	-10.3
Washington	158.0	83.3	+30.5	-30.5
West Virginia 1	158.3	104.3	+30.8	- 9.5
West Virginia 2	158.1	106.1	+30.6	- 7.7
Wisconsin 1	141.1	130.6	+13.6	+16.8*
Wisconsin 2	139.8	84.8	+12.3	-29.0
Wisconsin 3	113.0	109.2	-14.5	- 4.6*
Wisconsin 4	160.4	81.7	+32.9	-32.1
Wyoming	154.7	59.1	+27.2	-54.7

Coherences with birth-rate 22
 Oppositions to birth-rate 86

Total groups 108

A further comparison will show the relation of the birth-rate to the density of population, the value of manufactured product per capita, and the value of agricultural product both per capita and per acre of improved land. (Tables V and VI). The average density of population per square mile of area of settlement in 1880 was 31.96. In thirty-nine States and Territories the birth-rate and the density of population are opposed (Table VI). Twenty-three of these have a high birth-rate and a low rate of density; and twenty-two of these twenty-three are States and Territories in which the death-rate from nervous diseases is below the average. Sixteen of the thirty-nine States and Territories in which the birth-rate and the density oppose each other have a low birth-rate and a high rate of density, and in thirteen of these the deaths from nervous diseases are above the average; or, stating the result in another way,—all of the thirteen States and Territories in which the death-rate from nervous diseases is high have a population of more than average density.

TABLE V.
BIRTH-RATES AND FACTORS OF ECONOMIC CONDITION, 1880.

STATES AND TERRITORIES, 1880.	Birth-rate per 1000 wo- men between the ages of 15 and 49.	Deaths from nervous dis- eases per 1000 deaths from known causes.	Density per square mile of area of settlement.	Value of agricultural pro- ducts per acre of im- proved land.	Value of agricultural pro- ducts per capita.	Value of manufactured products per capita.
United States . .	127.5	113.8	31.96	\$7.77	\$44.11	\$106.50
Alabama	156.7	97.1	24.50	8.92	45.05	10.75
Arizona	114.4	70.1	5.52	10.96	15.19	15.29
Arkansas	190.0	104.9	15.13	12.18	54.57	8.42
California	110.7	108.1	11.38	5.60	69.07	134.40
Colorado	113.9	70.7	4.95	8.15	25.85	73.38
Connecticut . . .	83.2	151.2	128.52	10.95	28.92	298.21
Dakota	171.2	80.0	6.63	4.91	41.79	17.56
Delaware	113.2	116.9	74.80	8.46	43.11	139.60

TABLE V.—*Continued.*

STATES AND TERRITORIES, 1880.	Birth-rate per 1000 women between the ages of 15 and 49.	Deaths from nervous diseases per 1000 deaths from known causes.	Density per square mile of area of settlement.	Value of agricultural products per acre of improved land.	Value of agricultural products per capita.	Value of manufactured products per capita.
Dist. of Columbia	103.1	179.3	2732.70	\$ 40.73	\$ 2.90	\$ 66.90
Florida	145.9	121.0	8.06	7.85	27.61	20.53
Georgia	156.0	91.5	26.15	8.17	43.46	23.63
Idaho	183.3	86.0	2.61	7.68	46.47	38.98
Illinois	126.8	109.6	54.96	7.81	66.27	134.79
Indiana	122.4	112.9	55.09	8.23	57.97	74.82
Iowa	133.0	103.0	29.29	6.85	83.78	43.73
Kansas	156.4	87.9	15.81	4.86	52.45	30.97
Kentucky . . .	145.2	111.9	41.26	5.95	38.82	45.89
Louisiana . . .	148.5	105.3	20.70	15.65	45.62	25.75
Maine	81.1	121.6	36.26	6.30	33.82	123.02
Maryland . . .	122.8	129.4	94.82	8.63	30.85	114.21
Massachusetts .	82.9	128.9	221.78	11.38	13.55	353.96
Michigan . . .	114.7	99.8	34.66	10.99	55.69	92.07
Minnesota . . .	151.7	84.6	17.27	6.83	63.36	97.42
Mississippi . .	165.2	103.2	24.42	12.21	56.29	6.64
Missouri . . .	138.8	104.3	31.55	5.73	44.23	76.27
Montana . . .	153.4	91.2	4.40	7.71	51.71	46.88
Nebraska . . .	169.0	76.9	11.80	5.76	70.09	27.91
Nevada	122.2	81.2	5.30	8.29	45.86	35.01
New Hampshire	71.6	137.4	39.86	5.84	38.83	213.20
New Jersey . .	103.3	160.9	151.73	14.14	26.21	224.89
New Mexico . .	141.6	30.0	3.71	8.00	15.87	10.75
New York . . .	93.9	132.6	111.91	10.05	35.03	212.62
North Carolina.	154.7	86.0	28.81	7.98	37.04	14.36
Ohio	112.6	132.5	78.46	8.67	49.02	108.91
Oregon	145.0	100.6	7.12	6.02	75.73	62.55
Pennsylvania .	115.1	128.8	95.18	9.64	30.23	173.91
Rhode Island .	86.0	138.1	254.87	12.30	13.27	376.68
South Carolina.	162.6	84.8	33.00	9.95	41.29	16.81
Tennessee . .	158.7	95.3	36.94	7.31	40.25	24.03
Texas	187.4	101.9	12.74	5.15	40.96	13.02
Utah	198.9	80.8	8.80	8.02	23.18	30.04
Vermont	88.7	122.8	36.38	6.72	66.46	94.36
Virginia	147.3	109.4	37.70	5.37	30.23	34.23
Washington . .	158.0	83.3	3.60	8.70	56.08	43.27
West Virginia .	158.2	105.2	25.10	5.11	31.23	36.97
Wisconsin . . .	131.4	99.5	29.66	7.96	55.45	97.50
Wyoming . . .	154.7	59.1	3.25	4.48	17.91	43.22

TABLE VI.

COMPARISON OF BIRTH-RATES AND FACTORS OF ECONOMIC
CONDITION, 1880.

STATES AND TERRITORIES, 1880.	VARIATION ABOVE OR BELOW THE AVERAGE.					
	Birth-rate.	Deaths from ner- vous diseases.	Density.	Value of agricul- tural products per acre.	Value of agricul- tural products per capita.	Value of manu- factured pro- ducts per cap- ita.
Alabama	+29.2	-16.7	-7.46	+\$1.15*	+\$0.94*	-\$95.75
Arizona	-13.1	-43.7*	-26.44*	+3.19	-28.92*	-91.21*
Arkansas	+62.5	-8.9	-16.83	+4.41*	+10.46*	-98.08
California	-16.8	-5.7*	-20.58*	-2.17*	+24.96	+27.90
Colorado	-13.6	-43.1*	-27.01*	+0.38	-18.26*	-33.12*
Connecticut	-44.3	+37.4	+96.56	+3.18	-15.19*	+191.71
Dakota	+43.7	-33.8	-25.33	-2.86	-2.32	-88.94
Delaware	-14.3	+3.1	+42.84	+0.69	-1.00*	+33.10
District of Columbia	-24.4	+65.5	+2700.74	+32.96	-41.21*	-39.60*
Florida	+18.4	+7.2*	-23.90	+0.08*	-16.50	-85.97
Georgia	+28.5	-22.3	-5.81	+0.40*	-0.65	-82.87
Idaho	+55.8	-27.8	-29.35	-0.09	+2.36*	-67.52
Illinois	-0.7	-4.2*	+23.00	+0.04	+22.16	+28.29
Indiana	-5.1	-0.9*	+23.13	+0.46	+13.86	-31.68*
Iowa	+5.5	-10.8	-2.67	-0.92	+39.67*	-62.77
Kansas	+28.9	-25.9	-16.15	-2.91	+8.34*	-75.53
Kentucky	+17.7	-1.9	+9.30*	-1.82	-5.29	-60.61
Louisiana	+21.0	-8.5	-11.26	+7.88*	+1.51*	-80.75
Maine	-46.4	+7.8	+4.30	-1.47*	-10.29*	+16.52
Maryland	-4.7	+15.6	+62.86	+0.86	-13.26*	+7.71
Massachusetts	-44.6	+15.1	+189.82	+3.61	-30.56*	+247.46
Michigan	-12.8	-14.0*	+2.70	+3.22	+11.58	-14.43*
Minnesota	+24.2	-29.2	-14.69	-0.94	+19.25*	-9.08
Mississippi	+37.7	-10.6	-7.54	+4.44*	+12.18*	-99.86
Missouri	+11.3	-9.5	-0.41	-2.04	+0.12*	-30.23
Montana	+25.9	-22.6	-27.56	-0.06	+7.60*	-59.62
Nebraska	+41.5	-36.9	-20.16	-2.01	+25.98*	-78.69
Nevada	-5.3	-32.6*	-26.66*	+0.52	+1.75	-71.49*
New Hampshire	-55.9	+23.6	+7.90	-1.93*	-5.28*	+106.70
New Jersey	-24.2	+47.1	+119.77	+6.37	-17.90*	+118.39
New Mexico	+14.1	-83.8	-28.25	+0.23*	-28.24	-95.75
New York	-33.6	+18.8	+79.95	+2.28	-9.08*	+106.12
North Carolina	+27.2	-27.8	-3.15	+0.21*	-7.07	-92.14
Ohio	-14.9	+18.7	+46.50	+0.90	+4.91	+2.41
Oregon	+17.5	-13.2	-24.84	-1.75	+31.62*	-43.95
Pennsylvania	-12.4	+15.0	+63.22	+1.87	-13.88*	+67.41
Rhode Island	-41.5	+24.3	+222.91	+4.53	-30.84*	+270.18
South Carolina	+35.1	-29.0	+1.04*	+2.18*	-2.82	-89.69
Tennessee	+31.2	-18.5	+4.98*	-0.46	-3.86	-82.47
Texas	+59.9	-11.9	-19.22	-2.62	-3.15	-93.48
Utah	+71.4	-33.0	-23.16	+0.25*	-20.93	-76.46
Vermont	-38.8	+9.0	+4.42	-1.05*	+22.35	-12.14*
Virginia	+19.8	-4.4	+5.74*	-2.40	-13.88	-72.27
Washington	+30.5	-30.5	-28.36	+0.93*	+11.97*	-63.23
West Virginia	+30.7	-8.6	-6.86	-2.66	-12.88	-69.53
Wisconsin	+3.9	-14.3	-2.30	+0.19*	+11.34*	-9.00
Wyoming	+27.2	-54.7	-28.71	-3.29	-26.20	-63.28
Coherences with birth-rate	8	8	16	27	7	
Oppositions to birth-rate	39	39	31	20	40	
Total States and Territories	47	47	47	47	47	

In Table VI. the birth-rate is compared also with the value of agricultural products per acre of improved land. The statistics for agricultural products thus given indicate the intensity of cultivation as well as the fertility of the land that is cultivated, rather than the general character of the industry of the State. In thirty-one States and Territories the value of the agricultural products per acre of improved land is opposed to the birth-rate, and in twenty-five of these the opposition coincides with that for the density of population and the birth-rate; in twenty-four it coincides with the opposition for nervous diseases and the birth-rate, and in twenty-one the opposition for all three coincides; that is, the density, the death-rate from nervous diseases, and the value of agricultural products per acre of improved land oppose the birth-rate in twenty-one States and Territories.*

The statistics for the value of the agricultural products per capita, though they are computed on the basis of the total population, and are therefore of less scientific value than if computed on the basis of the purely agricultural population, indicate to a certain extent the general industrial character of the States and Territories. When compared with similar statistics for the value of manufactured products per capita, (Tables V. and VI.), they show plainly in which States and Territories agriculture is the chief industry, and in which manufactures prevail. The birth-rate follows the value of the agricultural products per capita in twenty-seven States and Territories (Table VI.), partially carrying out the general induction that agricultural conditions favor the birth-rate. Of these twenty-seven States and Territories, ten of the thirteen in which both the birth-rates and the agricultural values are low are States in which the value of manufactures per capita is high, and three (California, Illinois, and Ohio), which have a birth-rate below the average and

* Note that Illinois, Indiana and Michigan correspond in density, value of agricultural product, and the birth-rate, and that Kentucky, Tennessee, and Virginia correspond in deaths from nervous diseases, value of agricultural product, and the birth-rate.

agricultural values above, have also a high value of manufactured products per capita.

In Tables V. and VI. a comparison is made between the birth-rate and the net value of manufactured products per capita. Like the statistics for the value of the agricultural products per capita, these are based upon the total population, and not upon that part of it engaged in manufacturing. They indicate, however, which are the distinctly manufacturing States; namely, California, Connecticut, Delaware, Illinois, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, and Rhode Island. These States have a value of manufactured products per capita above the average value per capita in the United States. In forty States and Territories the birth-rate and the value of the manufactured products per capita are opposed, twenty-seven having a high birth-rate and a low value of manufactured products. Twelve of these have also a low density of population, a low death-rate from nervous diseases, and a low value of agricultural products per acre of improved land. Of the remaining thirteen, which have a low birth-rate and a high value of manufactured products, nine have also a high density of population, a high death-rate from nervous diseases, and a high value of agricultural products per acre of improved land. In other words, twenty-one of the forty-seven States and Territories cohere in density, deaths from nervous diseases, agricultural values per acre of improved land, and the value of manufactured products per capita, and have a birth-rate opposed to all of these factors. If the factor showing the intensity of agricultural cultivation be omitted, the results are even more noticeable. In thirty-seven States and Territories the value of the manufactured products per capita coheres with the death-rate from nervous diseases and opposes the birth-rate, and in four States the three cohere; thus in forty-one of the forty-seven States and Territories the value of the manufactured products per capita and the deaths from nervous diseases cohere.

In thirty-five States and Territories the value of the manufactured products per capita coheres with the density per square mile of area of settlement and is opposed to the birth-rate, and in three States the three cohere, making thirty-eight States and Territories in which the value of the manufactured products per capita and the density of population cohere.

In thirty-three States and Territories the value of the manufactured products per capita coheres with both the density of population and the deaths from nervous diseases and opposes the birth-rate, while in two States the four cohere. Thus in thirty-five of the forty-seven States and Territories in the United States, the conditions of density, manufactured wealth, and deaths from nervous diseases are similar, and in thirty-three of these States and Territories they directly oppose the birth-rate.

The only conclusion to be drawn from such facts is that the conditions of advancing civilization are actually lowering the birth-rate, and that the conditions of a simpler agricultural life favor a high birth-rate.

Through the courtesy of Mr. George K. Holmes of the Department of Farms, Homes, and Mortgages of the United States Census Bureau, the figures of the eleventh census have been obtained in advance for the mortgage indebtedness and the values of agricultural products per acre of improved land. As the figures of the birth-rate per thousand women of child-bearing age are not yet available, these statistics are compared with the figures of the birth-rate per thousand of population, which were given by Dr. Billings in his article on "The Diminishing Birth-rate in the United States."* The statistics of density of population† per square mile, the area of settlement, and the value of manufactured products‡ are already published so that, with the exception of

* *The Forum*, June, 1893.

† "Compendium of the Eleventh Census Report," Part I.

‡ "Extra Census Bulletin," No. 67.

the death-rate from nervous diseases, approximately the same comparisons that were made for 1880 can be made for 1890. The States of North Dakota and South Dakota will be omitted in this study, as their birth-rates are not given.

TABLE VII.

BIRTH-RATES AND FACTORS OF ECONOMIC CONDITION, 1890.

STATES AND TERRITORIES, 1890.	Birth-rate per 1000 population.	Density per square mile of area of settlement.	Density per square mile of total surface.	Value of agricultural pro- ducts per acre of im- proved land.	Value of manufactured products per capita.	Real estate mortgage debt in force per capita.
United States . .	26.68	32.16	21.31	\$6.88	\$149.63	\$96.00
Alabama	30.39	29.38	29.36	8.60	44.43	26.00
Arizona	24.94	2.42	0.53	10.05	15.89	39.00
Arkansas	33.78	21.27	21.27	9.70	20.09	13.00
California	19.41	12.51	7.75	7.12	176.64	200.00
Colorado	25.09	6.02	3.98	7.20	103.06	206.00
Connecticut	21.26	154.03	154.03	12.99	332.78	107.00
Delaware	24.89	85.97	85.97	8.50	222.99	96.00
Dist. of Columbia .	23.07	3544.50	3839.87	37.69	170.72	226.00
Florida	28.30	9.53	7.22	10.55	46.56	40.00
Georgia	30.31	31.15	31.15	8.70	37.51	15.00
Idaho	27.14	2.16	1.00	6.35	16.54	38.00
Illinois	27.63	68.33	68.33	7.20	237.47	100.00
Indiana	25.29	61.05	61.05	6.27	103.46	51.00
Iowa	26.15	34.46	34.46	6.27	65.41	104.00
Kansas	28.16	17.63	17.47	4.26	77.23	170.00
Kentucky	29.45	46.47	46.47	5.58	68.18	25.00
Louisiana	29.57	24.63	24.63	14.40	51.68	25.00
Maine	17.99	25.69	22.11	7.24	144.75	49.00
Maryland	25.87	105.72	105.72	7.75	164.85	62.00
Massachusetts . . .	21.51	278.48	278.48	16.94	396.69	144.00
Michigan	24.80	36.46	36.46	8.48	132.72	72.00
Minnesota	29.94	23.14	16.44	6.40	147.51	152.00
Mississippi	30.10	27.83	27.83	10.71	14.51	15.00
Missouri	28.72	38.98	38.98	5.55	120.89	80.00
Montana	22.81	2.82	0.91	6.85	41.67	66.00
Nebraska	29.22	16.79	13.78	4.38	87.86	126.00
Nevada	16.35	3.83	0.42	3.74	24.15	48.00
New Hampshire . . .	18.37	42.65	41.80	7.97	227.79	50.00
New Jersey	25.16	193.82	193.82	14.51	244.43	161.00
New Mexico	34.08	3.37	1.25	6.78	9.87	43.00
New York	23.28	128.76	125.95	9.86	285.37	268.00

TABLE VII.—*Continued.*

STATES AND TERRITORIES. 1890.	Birth-rate per 1000 of population.	Density per square mile of area of settlement.	Density per square mile of total surface.	Value of agricultural products per acre of improved land.	Value of manufactured products per capita.	Real estate mortgage debt in force per capita.
North Carolina . .	29.91	33.30	33.30	\$ 6.40	\$ 24.96	\$ 13.00
Ohio	24.08	90.10	90.10	7.27	174.74	71.00
Oregon	22.49	6.79	3.32	5.41	132.05	73.00
Pennsylvania . .	25.69	116.88	116.88	9.18	253.24	117.00
Rhode Island . .	22.38	318.44	318.44	15.37	412.44	106.00
South Carolina . .	31.07	38.16	38.16	9.77	27.74	12.00
Tennessee	30.60	42.34	42.34	5.90	40.94	23.00
Texas	31.27	14.82	8.52	5.38	31.51	42.00
Utah	31.20	7.71	2.53	8.92	42.86	39.00
Vermont	18.51	36.39	36.39	7.67	115.34	84.00
Virginia	27.12	41.27	41.27	4.63	53.36	17.00
Washington	23.54	9.46	5.22	7.51	119.55	126.00
West Virginia . .	30.41	30.95	30.95	4.49	50.74	26.00
Wisconsin	27.01	32.98	30.98	7.25	147.34	72.00
Wyoming	21.78	2.66	0.62	4.70	39.00	82.00

A comparison of the birth-rate and the density of population per square mile of area of settlement for 1890 (Tables VII. and VIII.) shows seventeen States and Territories in which the phenomena cohere, and twenty-nine in which they oppose each other; whereas in 1880 they were opposed in thirty-nine of the forty-seven States and Territories. This increase of coherences may be partly accounted for by the fact that the statistics of the birth-rate are computed on the basis of the total population, instead of on the basis of the women between the ages of fifteen and forty-nine, as in 1880. In four States and Territories (Montana, Oregon, Washington, and Wyoming) in which the phenomena cohere, the birth-rate is below the average for the United States, whereas in 1880, when the birth-rate was given per thousand women between fifteen and forty-nine years of age, it was above the

TABLE VIII.

COMPARISON OF BIRTH-RATES AND FACTORS OF ECONOMIC
CONDITION, 1890.

STATES AND TERRITORIES, 1890.	VARIATION ABOVE OR BELOW THE AVERAGE.					
	Birth-rate per 1000 of popu- lation.	Density per sq. mile of area of settlement.	Density per sq. mile of total surface.	Value of agricul- tural products per acre of im- proved land.	Value of manu- factured prod- ucts, per cap- ita.	Mortgage debt per capita.
Alabama	+3.71	-2.78	+8.05*	+\$1.72*	-\$105.20	-\$70.00
Arizona	-1.74	-29.74*	-20.78*	+3.17	-133.74*	-57.00*
Arkansas	+7.10	-10.89	-0.04	+2.82*	-129.54	-83.00
California	-7.27	-19.65*	-13.56*	+0.20	+27.01	+104.00
Colorado	-1.59	-26.14*	-17.33*	+0.32	-46.57*	+110.00
Connecticut	-5.42	+121.87	+132.72	+6.11	+183.15	+11.00
Delaware	-1.79	+53.81	+64.66	+1.62	+73.36	0.00
District of Columbia	-3.61	+3512.34	+3818.56	+30.81	+21.09	+130.00
Florida	+1.62	-22.63	-14.09	+3.57*	-103.07	-56.00
Georgia	+3.63	-1.01	+9.84*	+1.82*	-112.12	-81.00
Idaho	+0.46	-30.00	-20.31	-0.53	-133.09	-58.00
Illinois	+0.95	+36.17*	+47.02*	+0.32*	+87.84*	+4.00*
Indiana	-1.39	+28.89	+39.74	+0.61*	+46.17	-45.00*
Iowa	-0.53	+2.30	+13.15	-0.61	-84.22*	+8.00
Kansas	+1.48	-14.53	-3.84	-2.62	-72.40	+74.00*
Kentucky	+2.77	+14.31*	+25.16*	-1.30	-81.45	-71.00
Louisiana	+2.89	-7.53	-7.52*	+7.52*	-97.95	-71.00
Maine	-8.89	-6.47*	+0.80	+0.36	-4.88*	-47.00*
Maryland	-0.81	+73.56	+84.41	+0.87	+15.22	-34.00*
Massachusetts	-5.71	+246.32	+257.17	+10.06	+247.06	+48.00
Michigan	-1.88	+4.30	+15.15	+1.60	-16.91*	-24.00*
Minnesota	+3.26	-9.02	-4.87	-0.48	-2.12	+56.00*
Mississippi	+3.42	-4.33	+6.52*	+3.83*	-135.12	-81.00
Missouri	+2.04	+6.82*	+17.67*	-1.33	-28.74	-16.00
Montana	-3.87	-29.34*	-20.40*	-0.03*	-107.96*	-30.00*
Nebraska	+2.54	-15.37	-7.53	-2.50	-61.77	+30.00*
Nevada	-10.33	-28.33*	-20.89*	-3.14*	-125.48*	-48.00*
New Hampshire	-8.31	+10.49	+20.49	+1.09	+78.16	-46.00*
New Jersey	-1.52	+161.66	+172.51	+7.63	+94.80	+65.00
New Mexico	+7.40	-28.79	-20.06	-0.10	-139.76	-53.00
New York	-3.40	+96.60	+104.64	+2.98	+135.74	+172.00
North Carolina	+3.23	+1.16*	+11.99*	-0.48	-124.67	-83.00
Ohio	-2.60	+57.94	+68.79	+0.39	+25.11	-25.00*
Oregon	-4.19	-25.37*	-17.99*	-1.47*	-17.58*	-23.00*
Pennsylvania	-0.99	+84.72	+95.57	+2.30	+103.61	+21.00
Rhode Island	-4.30	+286.28	+297.13	+8.49	+262.81	+10.00
South Carolina	+4.39	+6.00*	+16.85*	+2.89*	-121.89	-84.00
Tennessee	+3.92	+10.18*	+21.03*	-0.98	-108.69	-73.00
Texas	+4.59	-17.34	-12.79	-1.50	-118.12	-54.00
Utah	+4.52	-24.45	-18.78	+2.04*	-106.77	-57.00
Vermont	-8.17	+4.23	+15.08	+0.79	-34.29*	-12.00*
Virginia	+0.44	+9.11*	+19.96*	-2.25	-96.27	-79.00
Washington	-3.14	-22.70*	-16.09*	+0.63	-30.08*	+30.00
West Virginia	+3.73	-1.21	+9.64*	-2.39	-98.89	-70.00
Wisconsin	+0.33	+0.82*	+9.67*	+0.37*	-2.29	-24.00
Wyoming	-4.90	-29.50*	-20.69*	-2.18*	-110.63*	-14.00*
Coherences with birth-rate	17	21	16	12	16	
Oppositions to birth-rate	29	25	30	34	29	
Total States and Territories	46	46	46	46	45	

In one State (Delaware) the mortgage debt per capita is the same as for the United States.

average; in Illinois the change is the other way. The excess of men in the population of Montana, Oregon, Washington, and Wyoming tends to make the birth-rate per thousand of population proportionally much lower than that per thousand of women between the ages of fifteen and forty-nine.* It may therefore be assumed that, if the birth-rates were calculated on the same basis as were those of 1880, these States and Territories would have higher rates than the average for the United States, and would show opposition instead of coherence in the phenomena of birth-rate and density. In three of the States in which the phenomena cohere, (Missouri, North Carolina, and Wisconsin), the density has increased so that it is above the average instead of below, as in 1880. The figures of the birth-rate are also slightly above the average. It is impossible to judge whether or not they would fall below the average, if they were computed on the basis of the number of women between the ages of fifteen and forty-nine. One State only (Maine) remains to be accounted for. During the last ten years Maine has added eight thousand square miles to its area of settlement,† and yet its total population has increased only 12,150,‡ or about 1.5 persons have been added for each additional square mile of area of settlement. This fact indicates that the population in other parts of the State must have decreased, as all land with less than two inhabitants per square mile is counted as unsettled area. These facts make plain the cause of the great decrease in density per square mile of area of settlement in Maine, which brings it below the average for the United States. The birth-rate remains below the average, as in 1880. With the exception of Montana, Oregon, Washington, and Wyoming, there are only thirteen States and Territories in which the phenomena of density and birth-rate cohere, and in eight of these the

* In Montana there are 43,605 more men than women; in Oregon 49,913; in Washington 85,734; in Wyoming 17,981.

† "Compendium of the Eleventh Census Report," I. p. xlvii.

‡ "Compendium of the Eleventh Census Report," p. 4, Table I. b.

phenomena cohered in 1880. The remaining five have already been discussed. The conclusion is that in at least twenty-five of the States and Territories the density and the birth-rate per thousand women between the ages of fifteen and forty-nine are opposed.

The comparison of farm values per acre of improved land with the birth-rates for 1890 shows apparently an exact coincidence with the results of the similar comparison for 1880. In sixteen States and Territories the phenomena cohere; they oppose each other in thirty (Tables VIII and VI). In fourteen of the forty-six States and Territories, however, the phenomena have changed their relative positions, but in such a way as to make the total result the same: in seven States and Territories (New Mexico, North Carolina, California, Maine, New Hampshire, Vermont, and Washington), the phenomena cohered in 1880 and are opposed in 1890; in seven States and Territories (Illinois, Indiana, Iowa, Montana, Nevada, Oregon, and Wyoming), they were opposed in 1880, and cohere in 1890. In six of these States and Territories (Illinois, Iowa, Montana, Oregon, Washington, and Wyoming), the variation results from the change in the birth-rate which has already been explained in comparing the statistics of birth-rate and density for 1880 and 1890. The variation in the remaining eight States and Territories is caused by the change in farm values: in four States and Territories (Indiana, Nevada, New Mexico, and North Carolina), the farm values per acre of improved land were above the average for the United States in 1880, and are below it in 1890; and in four States (California, Maine, New Hampshire, and Vermont), the opposite change has taken place. If the four States (Montana, Oregon, Washington, and Wyoming) whose birth-rates, if computed on the same basis as those of 1880, would probably have had a different relation to the average rate for the United States, be considered to vary in relation to farm values as they did in 1880, it will be seen that thirty-six of the forty-six States and Territories show the

same relations of the phenomena of birth-rate and farm values in 1890 that they did in 1880. This coincidence is but another proof that there is some dependence of the one upon the other.

A comparison of the birth-rate with the values of manufactured products per capita in 1890 (Table VIII.) shows twelve States and Territories in which the phenomena cohere and thirty-four in which they oppose each other. If the four States (Montana, Oregon, Washington, and Wyoming), whose birth-rate is estimated as above the average for the United States when computed on the basis of the number of women between the ages of fifteen and forty-nine, be so counted, the phenomena of the birth-rate and the values of manufactured products per capita will oppose each other in thirty-eight of the forty-six States and Territories. The coherences and the oppositions for 1890 are almost identical with those of 1880; in five States only (Illinois, Indiana, Iowa, Maine, and the District of Columbia) is there a difference, if Montana, Oregon, Washington, and Wyoming be omitted. In Illinois and Iowa, the relative position of the birth-rate has changed; in Indiana and the District of Columbia, the value of manufactures per capita has in 1890 risen above the average for the United States; in Maine it has fallen below the average; therefore, in forty-one of the forty-six States and Territories the relative conditions of manufactures and the birth-rate are the same in 1890 as they were in 1880.

If the average rates for the United States in 1880 and in 1890 be compared, the results obtained from the preceding detailed comparisons are confirmed. The birth-rate has diminished from 30.95 per thousand of population to 26.68.* The value of agricultural products per acre of improved land has also decreased: in 1880 it was \$7.77; in 1890, \$6.88. The density per square mile of area of settlement has increased from 31.96 to 32.16, and the density per square mile

* Billings, "The Diminishing Birth-rate in the United States,"—*The Forum*, June, 1893.

of total land surface, from 17.29 to 21.31. And, finally, the value of manufactured products has risen from \$106.50 per capita to \$149.63.

In his study of the conditions of mortgage indebtedness in the United States, Mr. Holmes has shown that the mortgage debt, in general, increases with expanding prosperity. We should therefore expect it to show coherence with the density, the value of manufactured products, and to some extent with the values of agricultural products per acre of improved land, and opposition to the birth-rate. A comparison of the statistics proves the truth of this assumption. The phenomena of the birth-rate and the mortgage debt cohere in sixteen States and Territories (Table VIII), and are opposed in twenty-nine. Of the sixteen in which the phenomena cohere, three of the four mentioned above (Montana, Oregon, and Wyoming) must be put among those in which the phenomena oppose each other, thus making thirty-six in this class. The mortgage indebtedness is above the average for the United States in fifteen States (California, Colorado, Connecticut, the District of Columbia, Iowa, Massachusetts, New Jersey, New York, Pennsylvania, Rhode Island, Washington, Illinois, Kansas, Minnesota, and Nebraska). Nine of these have a value of manufactured products per capita above the average for the United States. The others are principally western farming States (Colorado, Iowa, Washington, Kansas, Minnesota, Nebraska).

In order that the relative rise or fall of the various factors chosen for comparison may be more clearly seen, the percentages of variation for 1880 have been calculated for the five great divisions given in the census reports:—the North Atlantic, the South Atlantic, the North Central, the South Central, and the Western divisions. The results are shown in Table IX. and Chart III. In every division the death-rate from nervous diseases coheres with the value of the manufactured products per capita, and both oppose the birth-rate. The North Atlantic division, which has by far the greatest amount

of manufacturing, has much the highest death-rate from nervous diseases and the lowest birth-rate. This division has also the greatest density and the highest intensity of agricultural cultivation, as represented by the value of agricultural products per acre of improved land. That it is not mainly an agricultural region is shown by the low rate of agricultural values per capita.

TABLE IX.

BIRTH-RATES AND FACTORS OF ECONOMIC CONDITION BY GRAND DIVISIONS, 1880.

GRAND DIVISIONS.	Birth-rate per 1000 women between the ages of 15 and 49.	Death-rate from nervous diseases per 1000 deaths from known causes.	Density per square mile of area of settlement.	Value of agricultural products per acre of improved land.	Value of agricultural products per capita.	Value of manufactured products per capita.
North Atlantic	97.31	133.54	98.30	\$9.50	\$30.38	\$219.62
South Atlantic	147.95	99.81	30.66	7.41	35.29	38.52
North Central	128.67	107.15	33.71	7.38	58.19	89.18
South Central	163.08	102.32	22.13	8.00	44.67	20.78
Western	128.48	85.20	6.90	6.09	53.64	88.86
The United States . . .	127.50	113.79	31.96	7.77	44.11	106.50

VARIATIONS ABOVE OR BELOW THE AVERAGE.

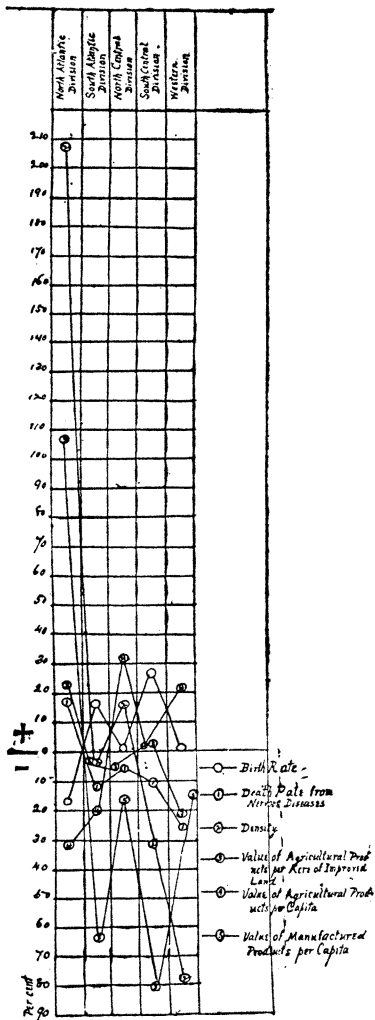
North Atlantic	-30.19	+19.75	+66.34	+1.73	-13.73	+113.12
South Atlantic	+20.45	-13.98	-1.30	-0.36	-8.82	-67.92
North Central	+1.17	-6.64	+1.75	-0.39	+14.08	-17.32
South Central	+35.58	-11.47	-9.83	+0.23	+0.56	-85.72
Western	+0.98	-28.59	-25.06	-1.68	+9.53	-17.64

PERCENTAGES OF VARIATION ABOVE OR BELOW THE AVERAGE.

North Atlantic	-23.68	+17.36	+207.57	+22.27	-31.13	+106.22
South Atlantic	+16.00	-12.29	-4.07	-4.63	-20.00	-63.83
North Central	+0.92	-5.83	+5.48	-5.02	+31.92	-16.26
South Central	+27.91	-10.08	-30.76	+2.96	+1.27	-80.49
Western	+0.77	-25.13	-78.41	-21.62	+21.61	-16.56

With one exception only (the North Central division), the density per square mile of area of settlement coheres with the death-rate from nervous diseases and the values of the manufactured products, and opposes the birth-rate; and with one exception (the South Central division, which

CHART III.
COMPARISON OF BIRTH-RATES AND FACTORS OF ECONOMIC CONDITIONS BY GRAND DIVISIONS, 1880.



represents a large population of indolent colored people), the values of agricultural products per acre of improved land cohere with the death-rates from nervous diseases and the values of manufactured products and oppose the birth-rate. On the other hand, the agricultural values per capita, with the exception of the South Atlantic division, cohere with the birth-rates and oppose the death-rates from nervous diseases and the values of manufactured products per capita.

In order still further to verify the conclusion that the birth-rate and the death-rate from nervous diseases are usually opposed, comparisons have been made from other available statistics. A study of the State of Massachusetts by counties shows that in 1885, in ten counties, the birth-rate per thousand women between the ages of fourteen and forty-nine opposed the death-rate from nervous diseases (Table X.). This is practically the same result as that obtained from the United States census figures.

A comparison of the birth-rate with the density of population per square mile gives a result very different from that of the United States census statistics. In eight of the fourteen counties, the birth-rate and the density cohere, in only six do they oppose each other; and in nine of the fourteen counties the density and the deaths from nervous diseases are opposed. Another unexpected result is found in Table XI. The birth-rate in the cities of Massachusetts since 1870 has been higher than in the rest of the State. These facts, which seem to be contrary to the results obtained for the United States as a whole, probably may be accounted for (1) by the peculiar race conditions in Massachusetts; and (2) because in the cities there is a large proportion of population between the ages of fourteen and forty-nine.

The rural population in Massachusetts consists of the old New England stock which is slowly dying out; the cities have a large Irish and French Canadian population, which is very prolific and, as statistics prove, less subject to nervous diseases than the native population. These peculiar

conditions in Massachusetts are anomalous and deserve to be the subject of a separate investigation. The larger proportion of population between the ages of fourteen and forty-nine, which probably is the cause of the higher marriage-rate in the cities (Table XI.), must be an important factor in increasing the birth-rate.

TABLE X.
BIRTH-RATES IN MASSACHUSETTS WITH COMPARISONS, 1885.

COUNTIES, 1885.	Birth-rate per 1000 women between 14 and 49.	Death-rate from nervous diseases per 1000 deaths from known causes.	Density per square mile.	VARIATIONS ABOVE OR BELOW THE AVERAGE.		
				Birth-rate.	Death-rate from nervous diseases.	Density.
Massachusetts	83.25	122.88	233.57	—19.00	+43.49	—162.00*
Barnstable	64.25	166.37	71.57	+8.60	+5.33*	—156.50
Berkshire	91.85	128.21	77.07	+4.92	+25.03*	+36.44*
Bristol	88.17	147.91	270.01	—30.83	+98.82	—188.93*
Dukes and Nantucket	52.42	221.70	44.64	—7.47	+14.86	+268.77
Essex	75.78	137.74	502.34	—7.51	—3.48*	—179.92*
Franklin	75.74	119.40	53.65	+14.50	—1.78	—49.69
Hampden	97.75	121.10	183.88	—16.21	+41.75	—152.39*
Hampshire	67.04	164.63	81.19	—3.42	+6.96	+182.88
Middlesex	79.83	123.84	416.45	—6.62	+9.92	—42.65*
Norfolk	76.63	132.80	190.92	—16.16	+11.89	—116.55*
Plymouth	67.09	134.77	117.02	+6.49	—33.58	+8639.53*
Suffolk	89.74	89.30	8873.10	+3.76	+17.76*	—80.66
Worcester	87.01	140.64	152.91			

Coherences with birth-rate	4	8
Oppositions to birth-rate	10	6
Total counties	14	14

TABLE XI.
BIRTH-RATES AND MARRIAGE-RATES IN MASSACHUSETTS, 1890.

CENSUS YEARS.	BIRTH-RATES PER 1000 OF POPULATION.		MARRIAGE RATES.	
	28 Cities.	Rest of State.	28 Cities.	Rest of State.
1870	28.9	23.5	11.8	8.4
1875	29.4	23.0	9.2	7.1
1880	27.6	20.9	9.5	7.6
1885	27.8	21.3	9.6	7.5
1890	28.4	21.7	10.2	7.8
Average for 5 years	28.4	22.0	10.0	7.7

Taken from the Registration Report of Massachusetts for 1890 (pp. 372-373).

The following conclusions may therefore be drawn from the preceding study:

1. Whether or not it be true that the means spoken of by Dr. Billings, M. Dumont, M. Levasseur, and Dr. Edson has become an important factor in the diminishing birth-rate of civilized countries, it is evident that it is not the only factor, and that, quite apart from voluntary prevention, there is a distinct problem to be investigated. This is shown by the fact that the white and the colored birth-rate vary together.

2. Mr. Spencer's generalization that the birth-rate diminishes as the rate of individual evolution increases is confirmed by a comparison of the birth-rates with the death-rates from nervous diseases, and also with the density of population, the values of agricultural and manufactured products, and the mortgage indebtedness.

3. The Malthusian theory in general, that population tends to increase faster than the means of subsistence, is not true of the United States at the present time. In the regions where wealth increases most rapidly, the population increases most slowly.

It is hoped that this study may be continued when the full statistics for 1890 are published, unless the work is done by the census office, and that ultimately a more complete investigation, on a different basis, may be made by taking statistics from the registration reports of several States and making the comparisons by counties and townships.

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